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on Armed Services, House of
Representatives

February 1992

STRATEGIC DEFENSE INITIATIVE

15-Year Funding Requirements



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National Security and
International Affairs Division

B-223094

February 24, 1992

The Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

In response to your request, we are providing details on the Strategic Defense Initiative Organization's (SDIO) estimated funding requirements through fiscal year 2005 for (1) the Global Protection Against Limited Strikes (GPALS) system's three segments—Global, National, and Theater Defenses, (2) the major weapon and sensor projects in each segment, (3) technology development, and (4) management and support for the whole Strategic Defense Initiative (SDI) program.

Background

In the spring of 1991, the Director of SDIO presented SDIO's estimated funding requirements through fiscal year 2005 during testimony before several congressional subcommittees. At that time, the focus of the SDI program was to create the GPALS system, which was intended to provide worldwide protection against limited, unauthorized, or accidental ballistic missile attacks. Since that time, congressional direction through the National Defense Authorization Act for Fiscal Years 1992 and 1993 has shifted the focus of the SDI program to a smaller Limited Defense System.

This fact sheet refers to the SDI program as it was presented during the spring of 1991, before the recent congressional action. All figures used are in fiscal year 1991 dollars. We believe this information will provide a useful starting point for future analyses of the SDI program. It should be noted, however, that SDIO is still adjusting SDI program plans in response to the congressional direction and significant changes can be expected.

Results in Brief

SDIO's estimated annual funding requirement for the SDI program will peak during fiscal years 1995 through 2000 at roughly \$7 billion in fiscal year 1991 dollars, as shown in figure 1. Between fiscal years 1991 and 2005, SDIO plans to spend about \$90 billion in fiscal year 1991 constant dollars on the SDI program, as shown in table 1. SDIO included in its funding requirements the costs for most of the GPALS architecture; the development of follow-on systems, such as directed energy weapons; and the transition to a Phase I Strategic Defense System, according to SDIO's Director of Financial Management. SDIO did not include replacement costs except for

initial spares, nor funding for the GPALS systems beyond fiscal year 2005, which may be required.

Figure 1: SDIO 15-Year Funding Requirements

8000 Fiscal year 1991 dollars in billions

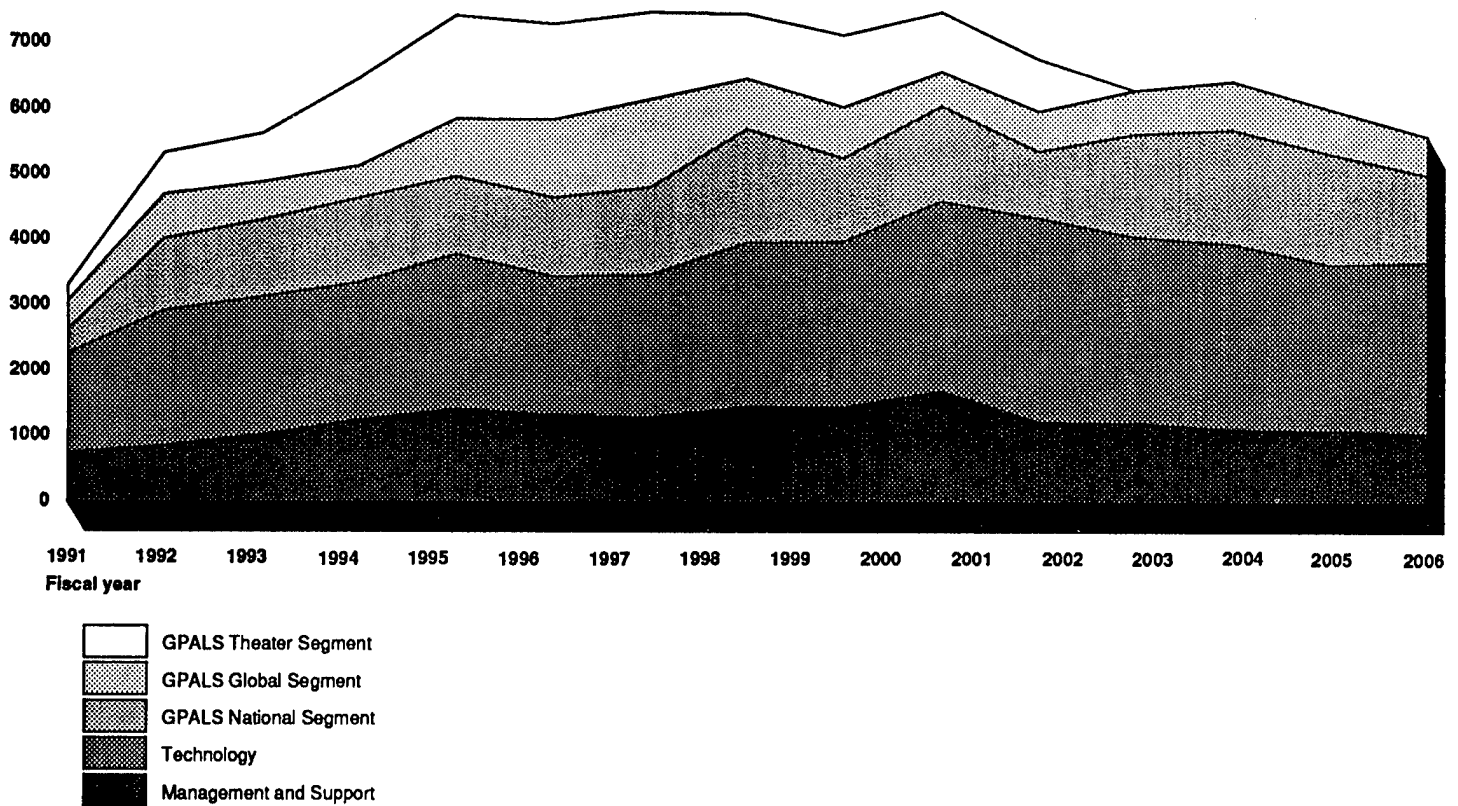


Table 1: SDIO's 15-Year Funding PlanDollars in millions^a

Fiscal year	GPALS Theater	GPALS Global	GPALS National	Technology	Management & Support	Total
1991	\$218.2	\$392.0	\$355.9	\$1,413.4	\$713.0	\$3,092.5
1992	590.9	635.0	1,022.3	1,930.0	815.6	4,993.7
1993	687.7	542.0	1,091.9	1,969.8	973.6	5,264.9
1994	1,245.2	463.0	1,203.0	1,957.5	1,184.5	6,053.1
1995	1,445.0	823.2	1,110.1	2,208.6	1,339.9	6,926.7
1996	1,335.7	1,106.9	1,138.4	1,975.6	1,246.0	6,802.7
1997	1,210.4	1,255.8	1,250.2	2,036.3	1,216.9	6,969.7
1998	905.3	707.5	1,624.7	2,340.7	1,373.1	6,951.3
1999	1,005.7	722.7	1,498.7	2,368.3	1,363.6	6,958.9
2000	829.1	478.1	1,364.1	2,712.2	1,596.5	6,979.9
2001	731.4	569.6	950.8	2,919.2	1,155.5	6,326.5
2002	0.0	615.4	1,470.8	2,654.1	1,148.9	5,889.2
2003	0.0	681.4	1,640.1	2,635.3	1,050.1	6,006.8
2004	0.0	628.8	1,596.9	2,373.6	1,033.7	5,633.0
2005	0.0	552.2	1,250.5	2,448.3	998.5	5,249.4
Total	\$10,204.8	\$10,173.5	\$18,568.3	\$33,942.7	\$17,209.2	\$90,098.5

^aFiscal year 1991 constant dollars

Note: Totals may not add due to rounding.

We have divided SDIO's funding requirements into five categories: (1) GPALS Theater, (2) GPALS Global, (3) GPALS National, (4) Technology, and (5) Management and Support. The three GPALS categories contain funding for the interceptor and sensor systems associated with each segment of the GPALS system. Technology contains funding for projects to develop technology for the interceptor and sensor systems in the three GPALS segments and for projects to develop technology not related to GPALS, such as directed energy. Management and Support contains funding for projects related to managing the SDI program and providing integration and support services, to include the National Test Bed. Technology will receive the most funding during the 15-year period (see fig. 2). The GPALS Theater and Global categories will receive about equal amounts of funding.

**Figure 2: Total Cost of the SDI Program,
Fiscal Years 1991-2005**

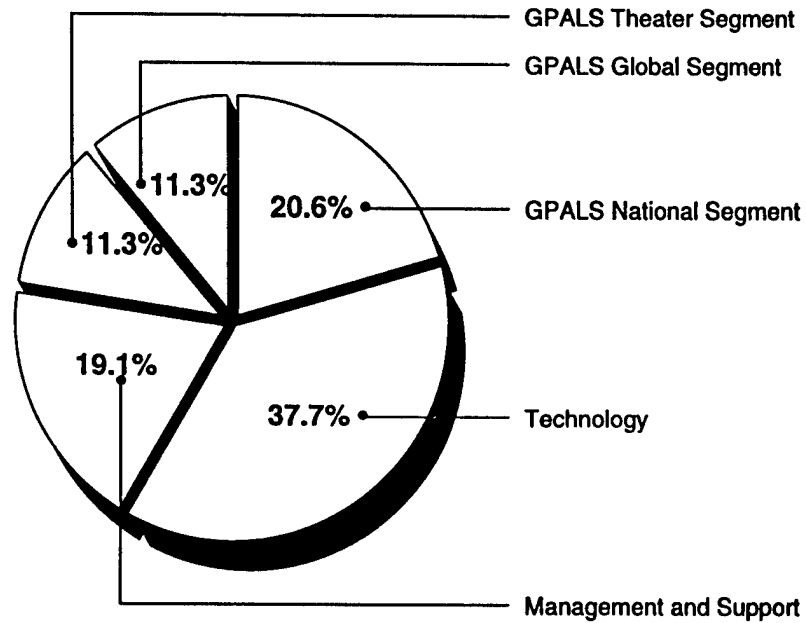
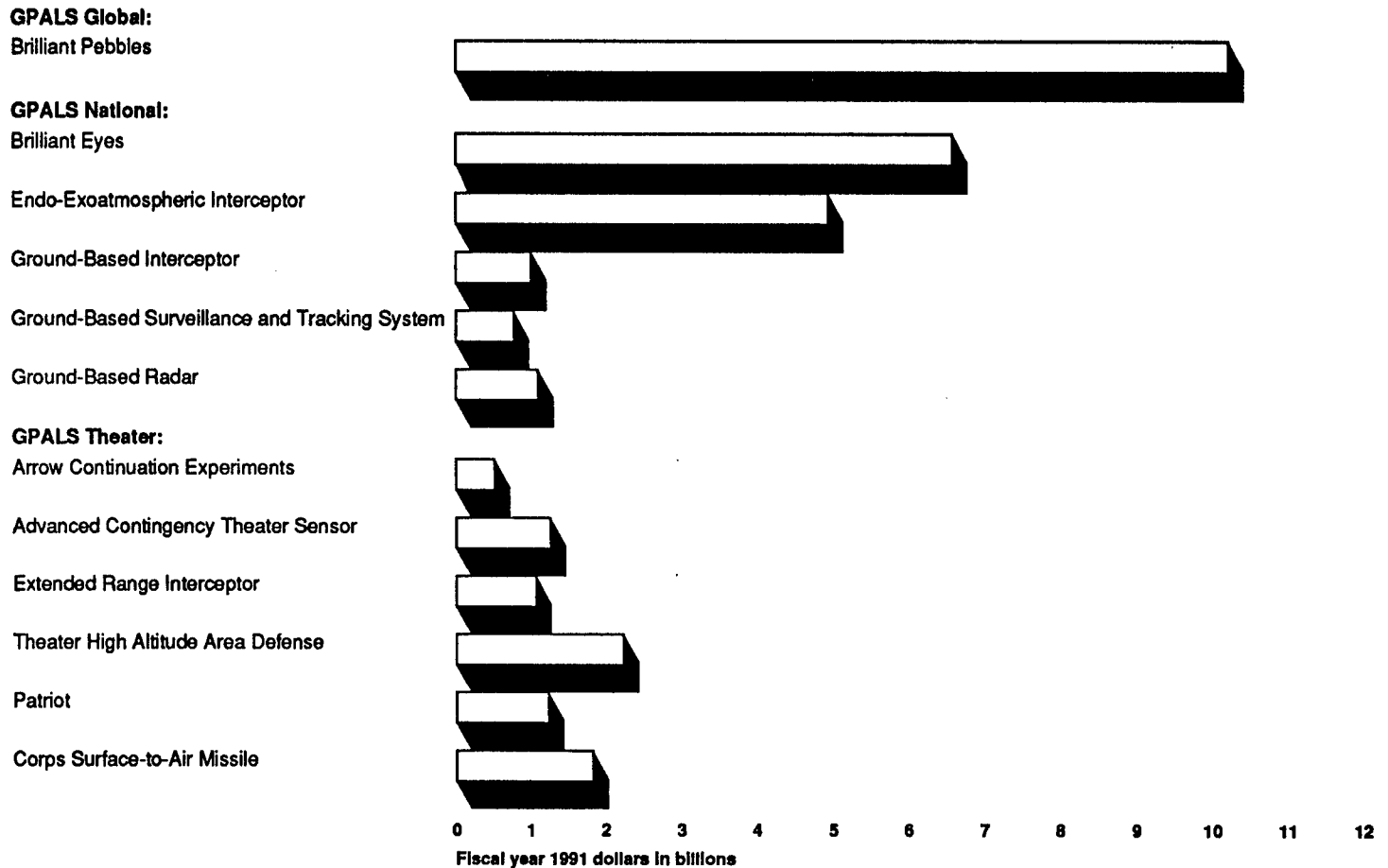


Figure 3 shows the total estimated costs for the weapon and sensor systems in each of the three GPALS funding categories for fiscal years 1991 through 2005. Among these systems, the Brilliant Pebbles interceptor project, which is the only system in the GPALS Global segment, is expected to receive more funding than any other single project. Appendixes I through V contain further details on SDIO's funding requirements for each of the categories.

Figure 3: Cost of Systems in the Three GPALS Segments, 1991-2005

Scope and Methodology

We interviewed SDIO's Director of Financial Management and obtained detailed budget data on each SDI project from fiscal year 1991 through fiscal year 2005.

The financial data in this fact sheet reflects the SDI program as it appeared during the spring of 1991. The data for fiscal year 1991 are the actual appropriations; the data for fiscal years 1992 and 1993 are the amounts

SDIO requested in its 1992-1993 budget. We derived the funding categories used in this report from a previous GAO report.¹ We also have combined the GPALS Technology and the Other Technology categories. We based the funding categories on SDIO's work breakdown structure, which it uses to manage the SDI program.

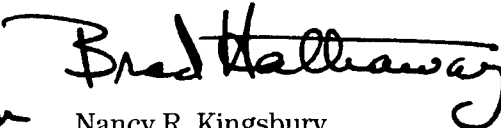
We conducted our review between November 1991 and January 1992 in accordance with generally accepted government auditing standards.

We did not obtain formal agency comments that were fully coordinated within DOD. However, we held an exit conference with program officials to discuss the results of our review, obtain their views and ensure that there was general agreement on the information presented. We have incorporated their comments as appropriate throughout the report.

Unless you publicly announce this fact sheet's contents earlier, we plan no further distribution until 10 days from its issue date. At that time, we will send copies to the Chairmen, House and Senate Committees on Appropriations and Senate Committee on Armed Services; the Secretary of Defense; the Director, Office of Management and Budget; and the Director, Strategic Defense Initiative Organization. We will also make copies available to others upon request.

Please contact me on (202) 275-4268 if you or your staff have any questions concerning this fact sheet. Major contributors were Brad Hathaway, Associate Director; J. Klein Spencer, Assistant Director; and Paula J. Haurilesko, Evaluator-in-Charge.

Sincerely yours,


for Nancy R. Kingsbury
Director
Air Force Issues

¹Strategic Defense Initiative: Options for Revising Program Elements Used to Fund Program (GAO/NSIAD-92-10, Nov. 1991).

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Abbreviations

ACES	Arrow Continuation Experiments
CORPS SAM	Corps Surface-to-Air Missile
DOD	Department of Defense
GPALS	Global Protection Against Limited Strikes
SDI	Strategic Defense Initiative
SDIO	Strategic Defense Initiative Organization

Global Protection Against Limited Strikes: Global Segment

The Brilliant Pebbles space-based interceptor project is the only project included in the funding category for the GPALS Global segment. Figure I.1 shows SDIO's projected schedule for the demonstration and validation, full-scale development, and production phases for Brilliant Pebbles. Funding for the production phase is shown as concurrent with the full-scale development phase from 1997 through 1999. According to one SDIO official, this concurrency may occur when long lead times are needed for production.

Figure I.1: GPALS Global Segment Acquisition Schedule

System and Phase

Brilliant Pebbles:

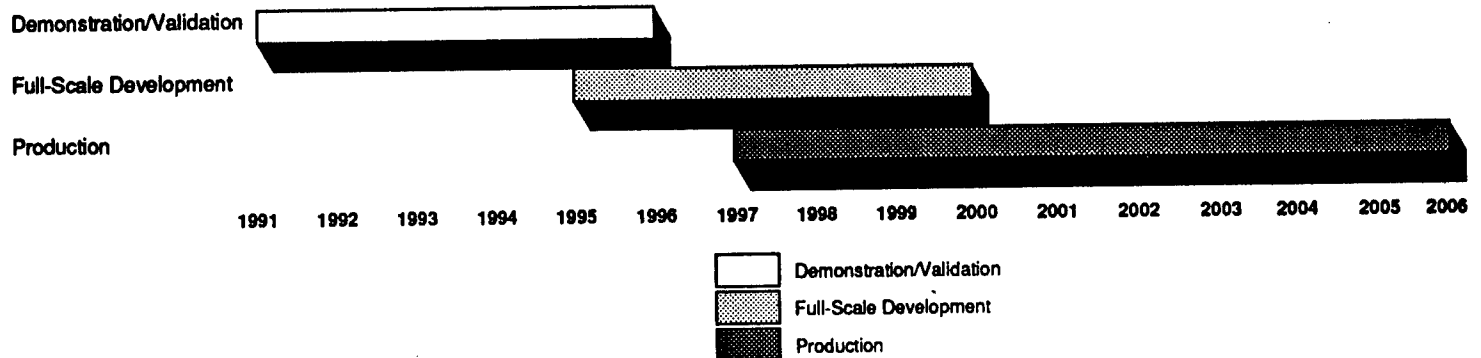
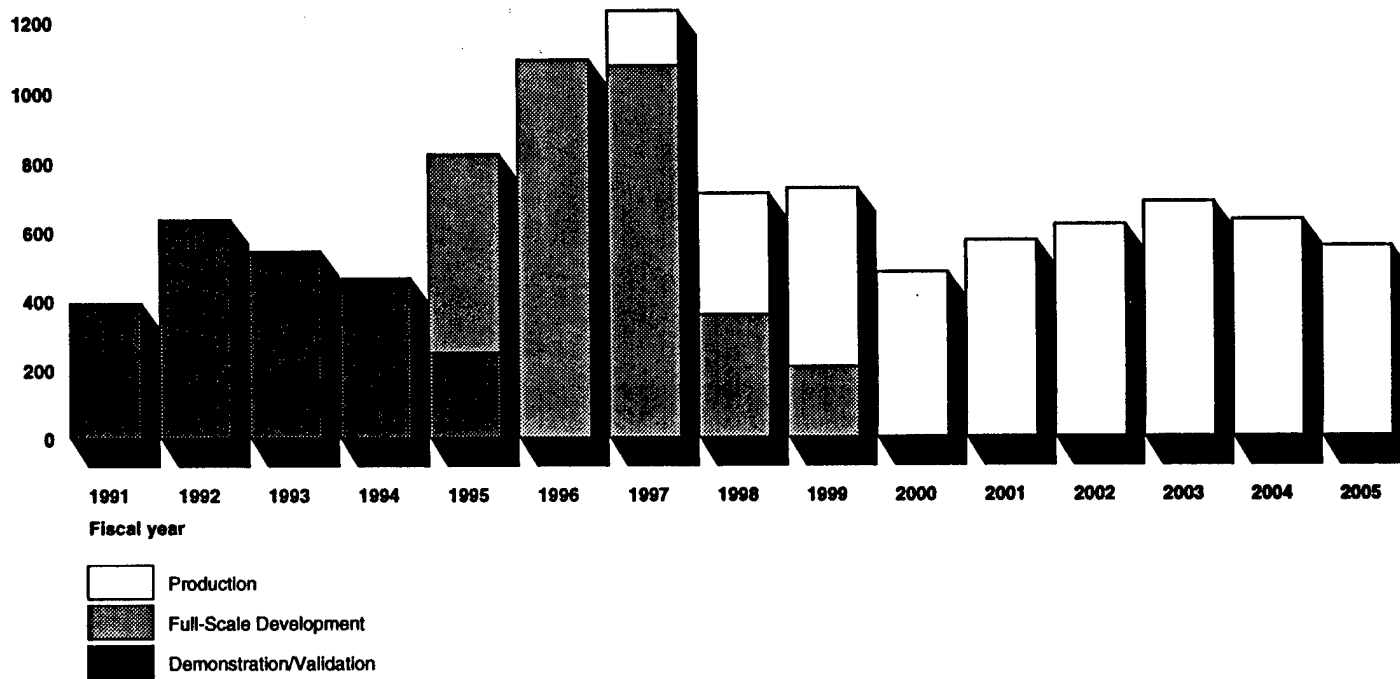


Figure I.2 shows the funding SDIO planned for each phase of Brilliant Pebbles development. Total annual funding peaks during fiscal year 1997 at nearly \$1.3 billion, most of which is planned for the full-scale development phase. Production funding peaks during fiscal year 2003 at about \$681.4 million.

Appendix I
Global Protection Against Limited Strikes:
Global Segment

Figure I.2: Planned Funding for Brilliant Pebbles

1400 Fiscal year 1991 dollars in millions



Global Protection Against Limited Strikes: National Segment

The GPALS National segment includes four ground-based systems, the space-based sensor called Brilliant Eyes, and a command center element. The ground-based systems include the Endo-Exoatmospheric Interceptor, the Ground-Based Interceptor, the Ground-Based Surveillance and Tracking System, and the Ground-Based Radar. Annual funding for the GPALS National segment peaks at about \$1.6 billion during fiscal years 1998 and 2003. Figure II.1 shows each of the systems in the GPALS National segment and their planned acquisition schedules.

Appendix II
Global Protection Against Limited Strikes:
National Segment

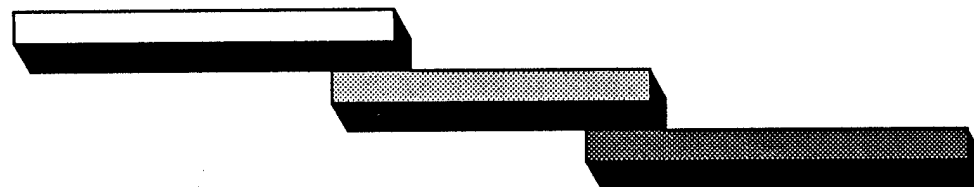
Figure II.1: GPALS National Segment Acquisition Schedule

System and Phase

Brilliant Eyes



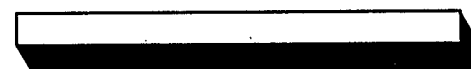
Endo-Exoatmospheric Interceptor



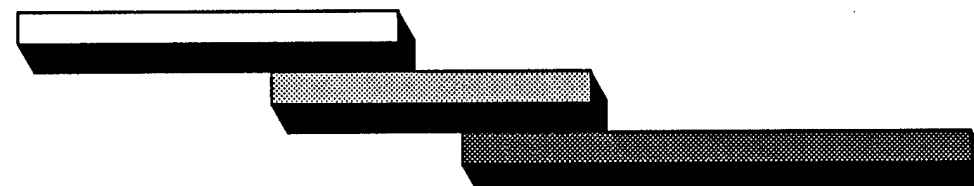
Ground-Based Interceptor



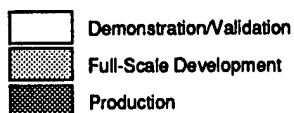
Ground-Based Surveillance and Tracking System



Ground-Based Radar



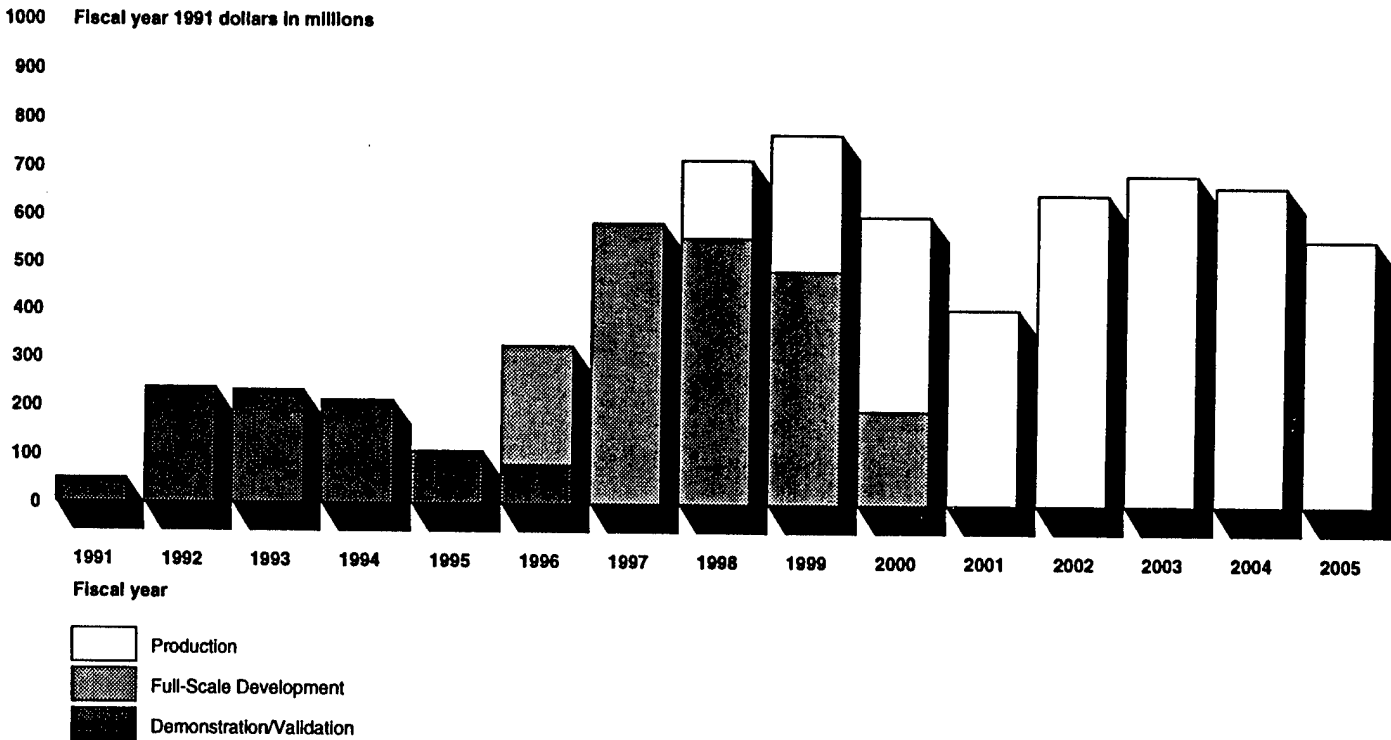
Fiscal year



Brilliant Eyes

SDIO's planned funding for the Brilliant Eyes sensor, the only space-based system in the GPALS National segment, peaks in fiscal year 1999, during the second year that SDIO planned to fund production (see fig. II.2). However, most of the funding for fiscal year 1999 is planned for full-scale development. Production funding peaks at \$687.8 million during fiscal year 2003.

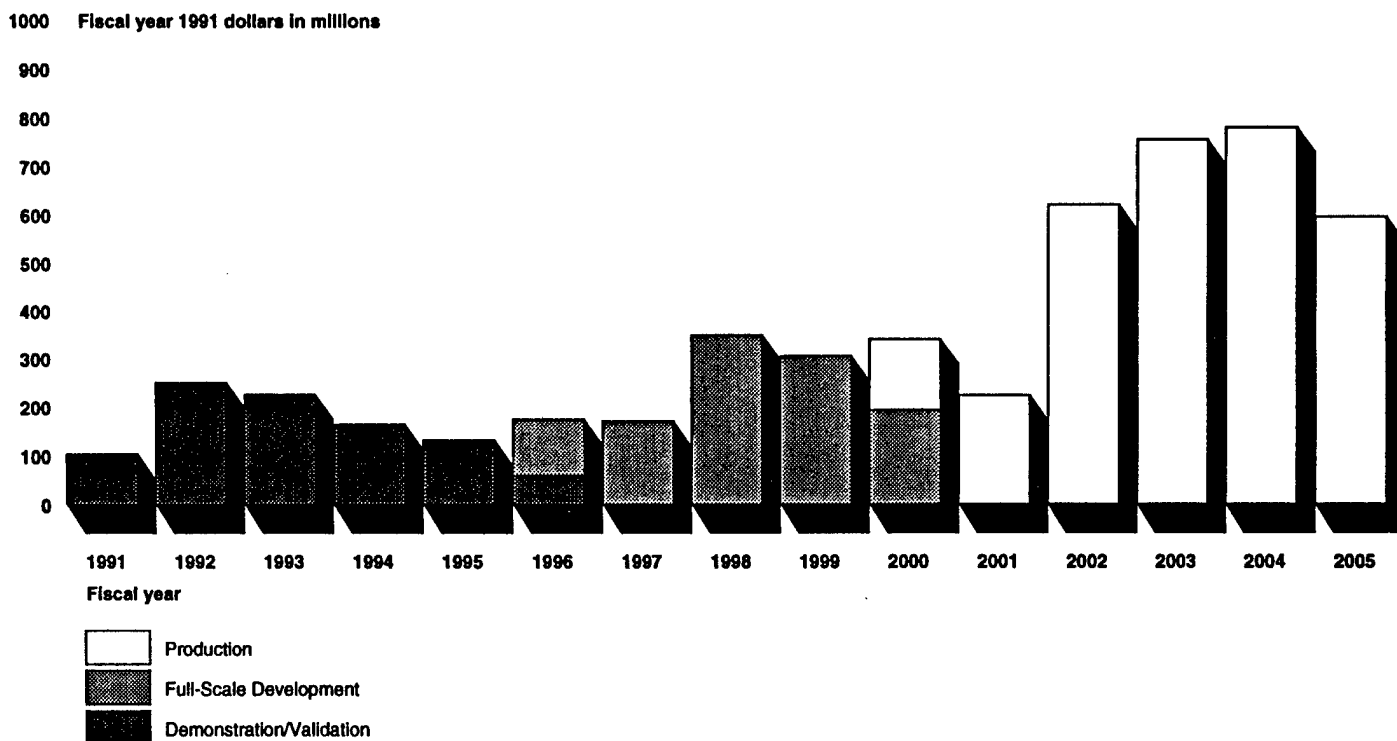
Figure II.2: Planned Funding for Brilliant Eyes



Endo-Exoatmospheric Interceptor

SDIO's planned funding for the Endo-Exoatmospheric Interceptor peaks during the production phase, as shown in figure II.3. Maximum funding occurs during fiscal year 2004, at \$778.1 million. At the time SDIO estimated these funding requirements, the Endo-Exoatmospheric Interceptor was competing against the Ground-Based Interceptor to become the interceptor for the GPALS National segment.

Figure II.3: Planned Funding for the Endo-Exoatmospheric Interceptor

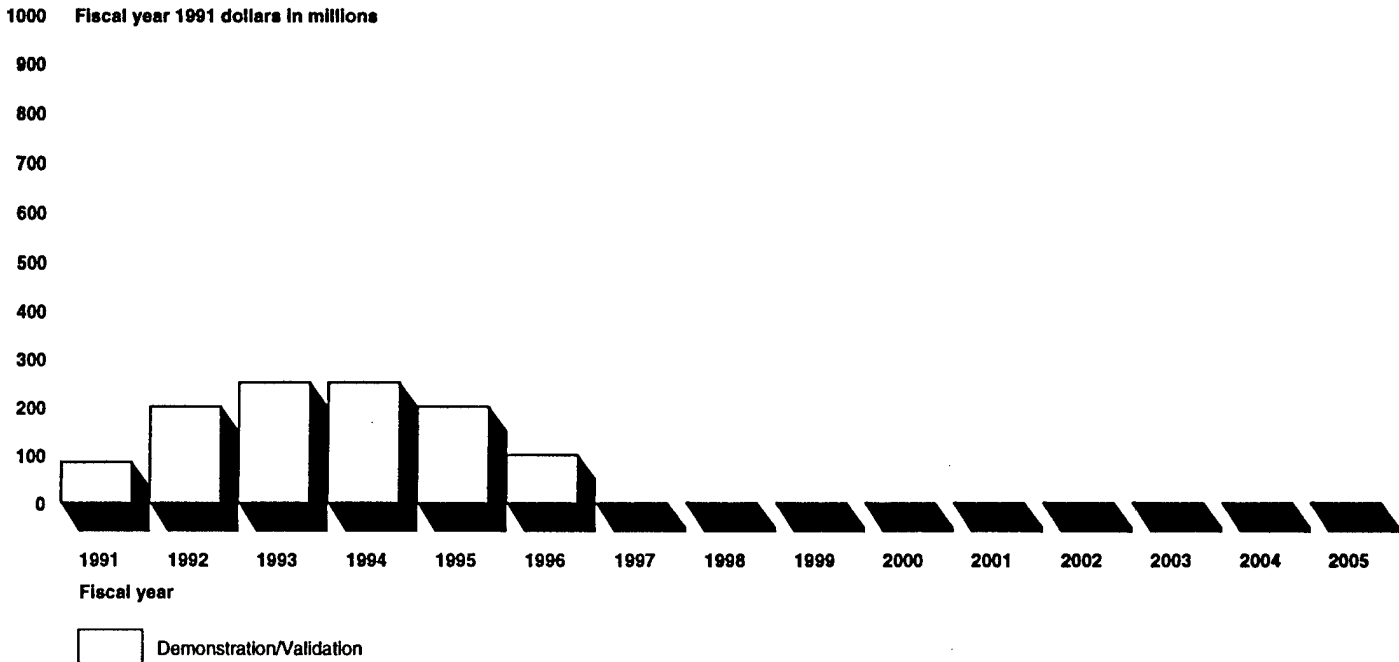


Ground-Based Interceptor

SDIO's planned funding for the demonstration and validation phase of the Ground-Based Interceptor peaks at \$250 million during fiscal years 1993 and 1994. Figure II.4 shows no funding for full-scale development or production of the Ground-Based Interceptor. SDIO budgeted funds for the full-scale development and production phases of the Endo-Exoatmospheric Interceptor instead of for the Ground-Based Interceptor. SDIO estimates that the Endo-Exoatmospheric Interceptor is the more expensive of the two interceptors. If the Ground-Based Interceptor is chosen during the competition, then SDIO will shift the funds needed to develop it, according to the Director of Financial Management. However, SDIO has indicated that if it decides to continue with both interceptors through the full-scale development phase, it will need more funds.

Appendix II
Global Protection Against Limited Strikes:
National Segment

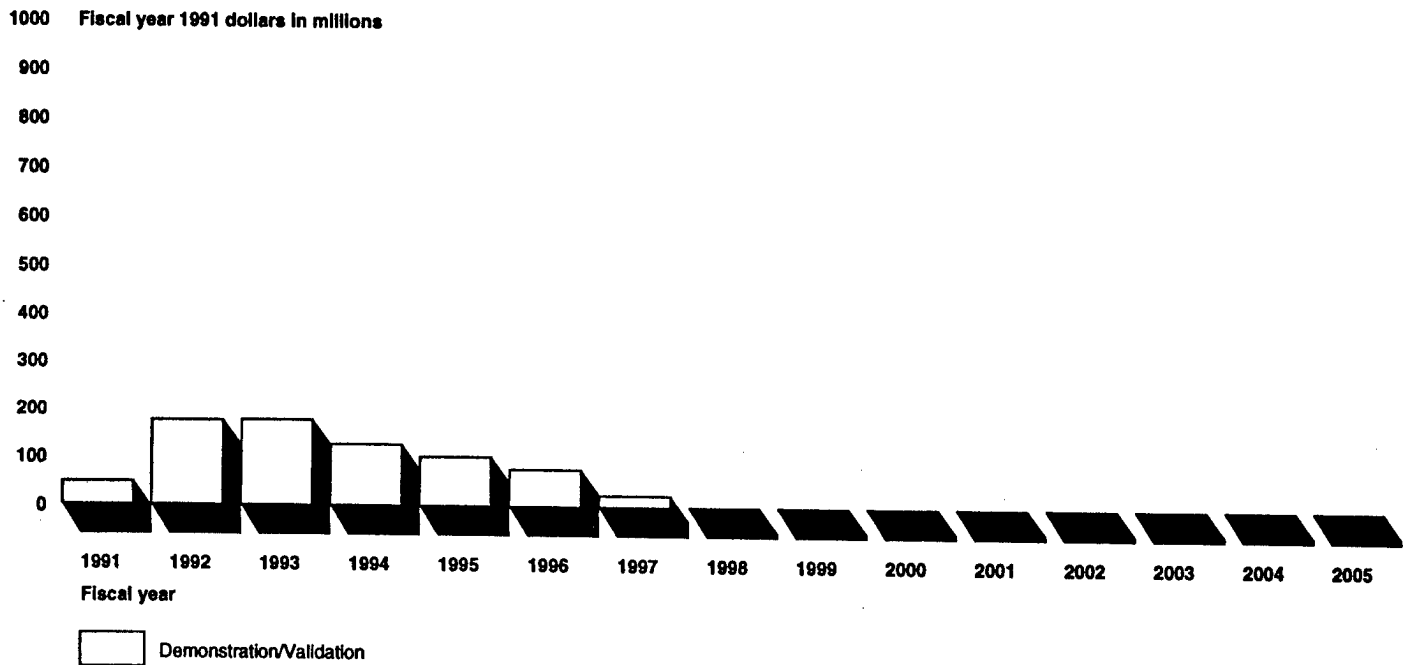
Figure II.4: Planned Funding for the Ground-Based Interceptor



Ground-Based Surveillance and Tracking System

SDIO has planned funding only for the demonstration and validation phase of the Ground-Based Surveillance and Tracking System (see fig. II.5). SDIO did not specify full-scale development or production funding for the Ground-Based Surveillance and Tracking System in its funding requirements because further funding depends on the outcome of the competition between the Ground-Based Interceptor and the Endo-Exoatmospheric Interceptor, according to SDIO. The Ground-Based Surveillance and Tracking System could aid the Ground-Based Interceptor with mid-course discrimination and together would provide a stand-alone limited defense option, according to SDIO documents. Funding for the demonstration and validation phase of the Ground-Based Surveillance and Tracking System project peaks during fiscal year 1993 at \$175.2 million.

Figure II.5: Planned Funding for the Ground-Based Surveillance and Tracking System

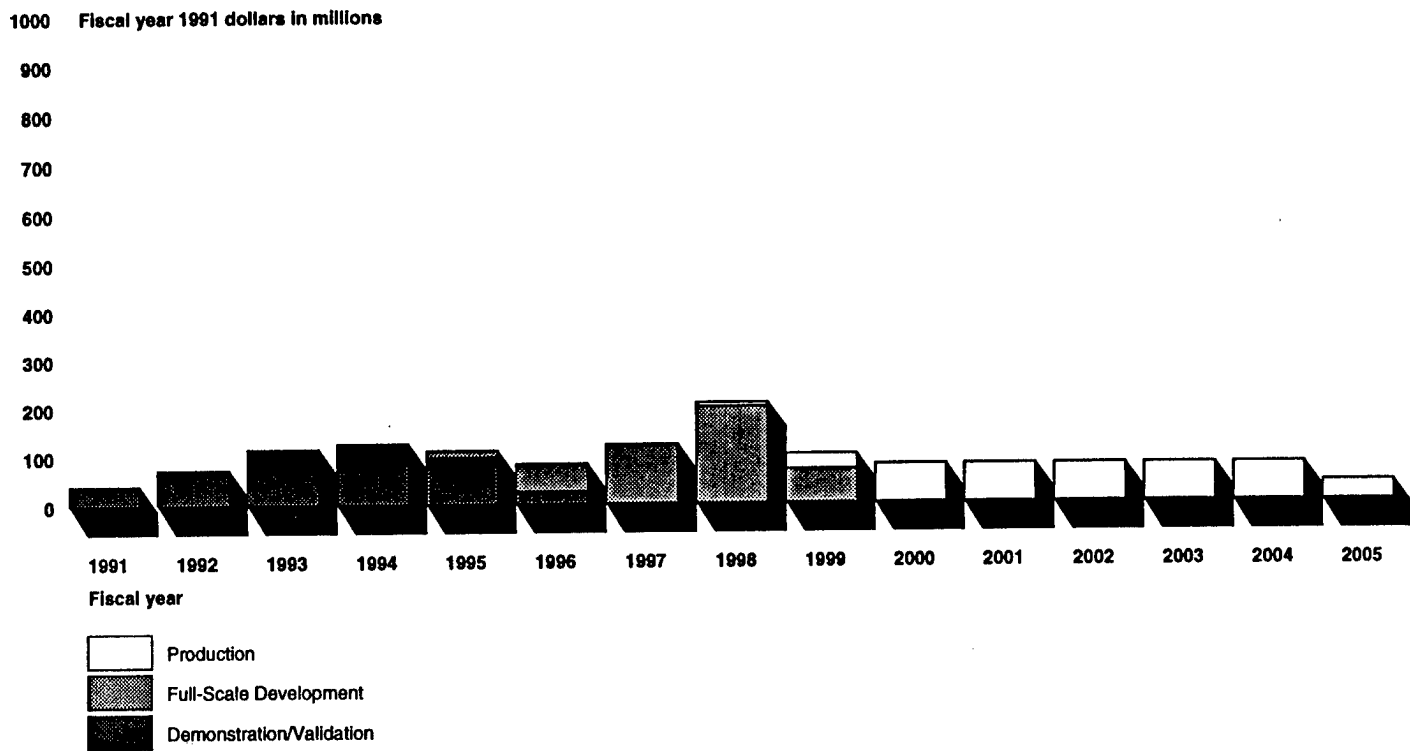


Ground-Based Radar

SDIO plans to use the Ground-Based Radar for both the GPALS National and Theater segments. Figure II.6 shows that overall funding for the radar is fairly even, except for fiscal year 1998, when funding peaks at \$206.1 million. SDIO plans to use most of the funds in fiscal year 1998 for full-scale development.

Appendix II
Global Protection Against Limited Strikes:
National Segment

Figure II.6: Planned Funding for the Ground-Based Radar



Global Protection Against Limited Strikes: Theater Segment

The GPALS Theater segment includes the six interceptors and sensors from the former Tactical Missile Defense Initiative: (1) Arrow Continuation Experiments, (2) Advanced Contingency Theater Sensor, (3) Extended Range Interceptor, (4) Theater High Altitude Area Defense, (5) Patriot, and (6) Corps Surface-to-Air Missile. Funding for the GPALS Theater segment peaks at \$1.4 billion in fiscal year 1995. Figure III.1 shows that SDIO funding for each of these systems finishes at the end of fiscal year 2001. According to SDIO, at that point it will have developed the systems and transferred the operation and maintenance of these systems to the appropriate service. The GPALS Theater segment funding category also includes funding for theater applications of directed energy technology and theater missile defense integration projects.

Appendix III
Global Protection Against Limited Strikes:
Theater Segment

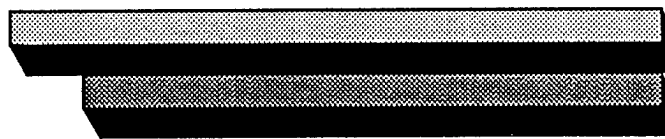
Figure III.1: GPALS Theater Segment Acquisition Schedule

System and Phase

Arrow Continuation
Experiments



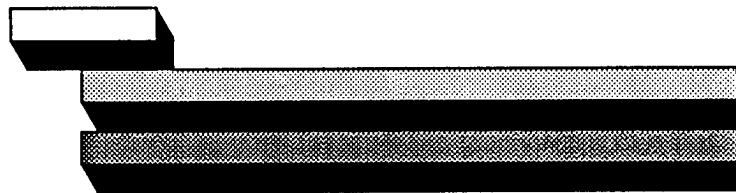
Advanced Contingency
Theater Sensor



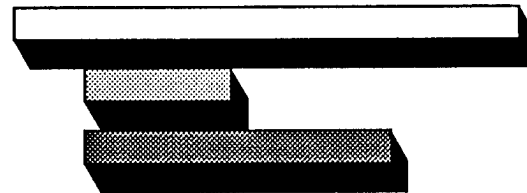
Extended Range Interceptor



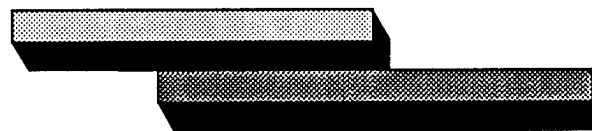
Theater High Altitude
Area Defense



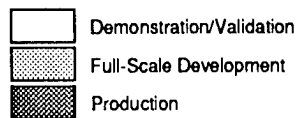
Patriot



Corps Surface-to-Air Missile



Fiscal year

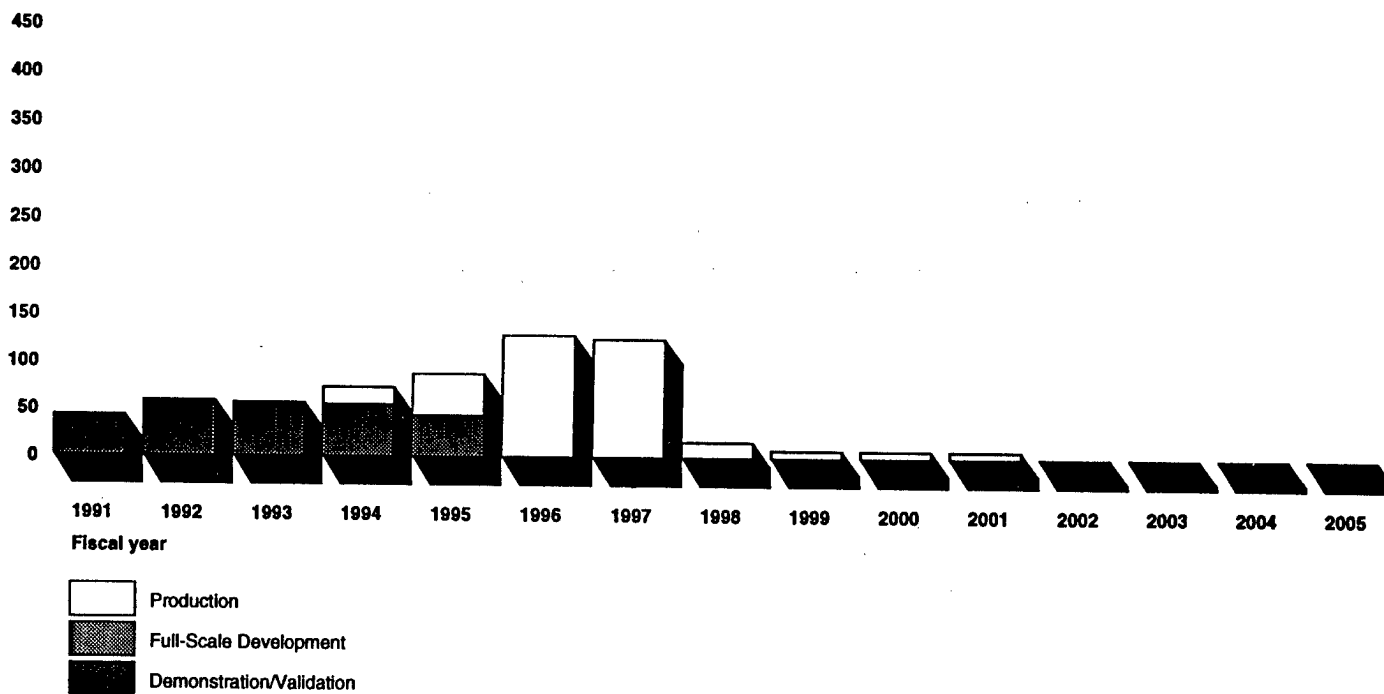


Arrow Continuation Experiments

The Arrow Continuation Experiments (ACES) project is a joint effort between the United States and Israel to develop an interceptor for tactical ballistic missile defense. ACES is a follow-on to the Arrow research and development project. SDIO has planned no funding for the full-scale development stage of ACES, as shown in figure III.2. According to SDIO's Director of Financial Management, SDIO may use the funds listed as production funding to buy ACES from Israel. This production funding peaks at \$127.5 million during fiscal year 1996.

Figure III.2: Planned Funding for the Arrow Continuation Experiments

500 Fiscal year 1991 dollars in millions

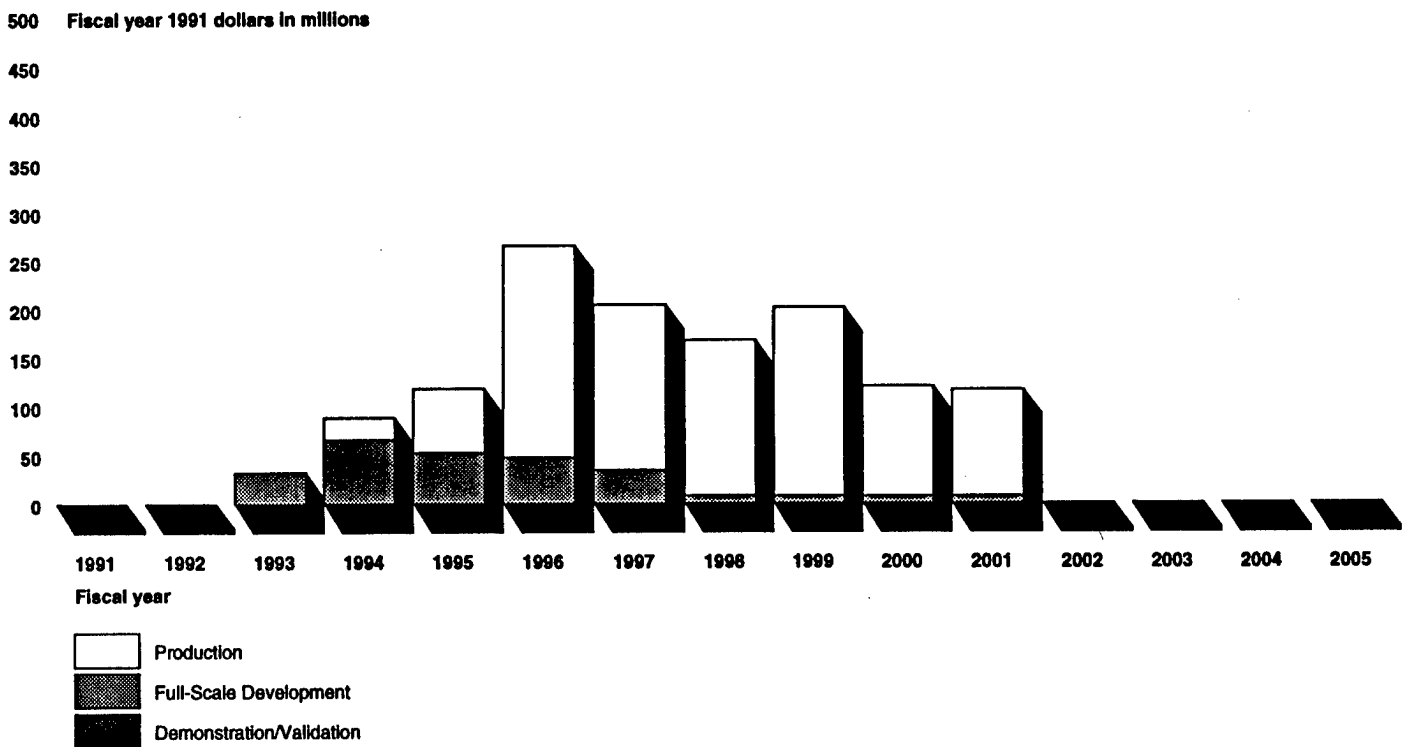


Advanced Contingency Theater Sensor

The Advanced Contingency Theater Sensor project is intended to develop a rapidly deployable sensor to support theater missile defense. SDIO has planned no funding for a demonstration and validation phase of technology development (see fig. III.3). Instead, it is funding the demonstration and validation phase through a technology development project. The Advanced Contingency Theater Sensor project has a high level of concurrence between the full-scale development and production phases, as previously

shown in figure III.1. According to SDIO, they are currently addressing the concurrency problem. Funding for the Advanced Contingency Theater Sensor peaks at \$265.4 million in fiscal year 1996.

Figure III.3: Planned Funding for Advanced Contingency Theater Sensor

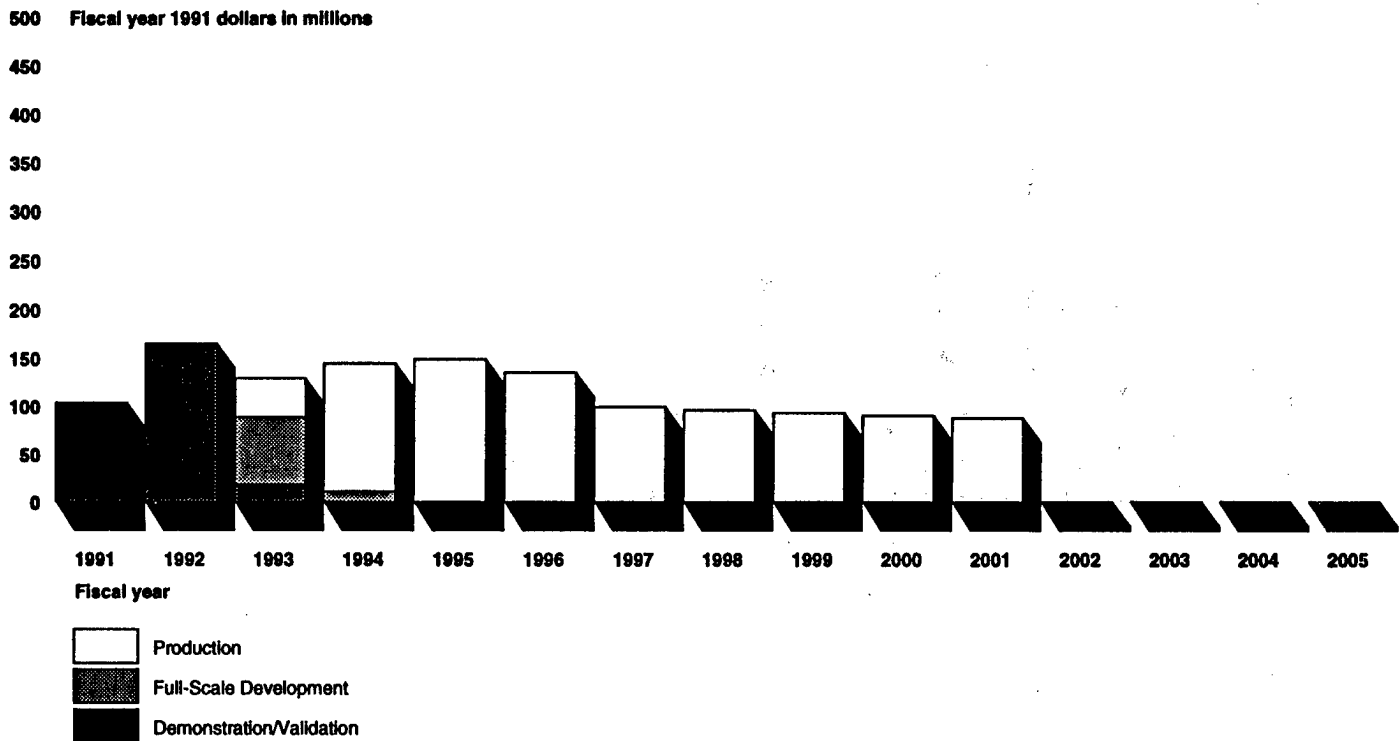


Extended Range Interceptor

The Extended Range Interceptor project is intended to develop a small interceptor that could be deployed with the Patriot and used against air-breathing threats and tactical ballistic missiles. As shown in figure III.4, annual funding for the Extended Range Interceptor reaches its peak of \$164.7 million in fiscal year 1992, during the demonstration and validation phase. SDIO planned to fund full-scale development for the Extended Range Interceptor for only 2 years, which coincides with the beginning of funding for the production phase.

Appendix III
Global Protection Against Limited Strikes:
Theater Segment

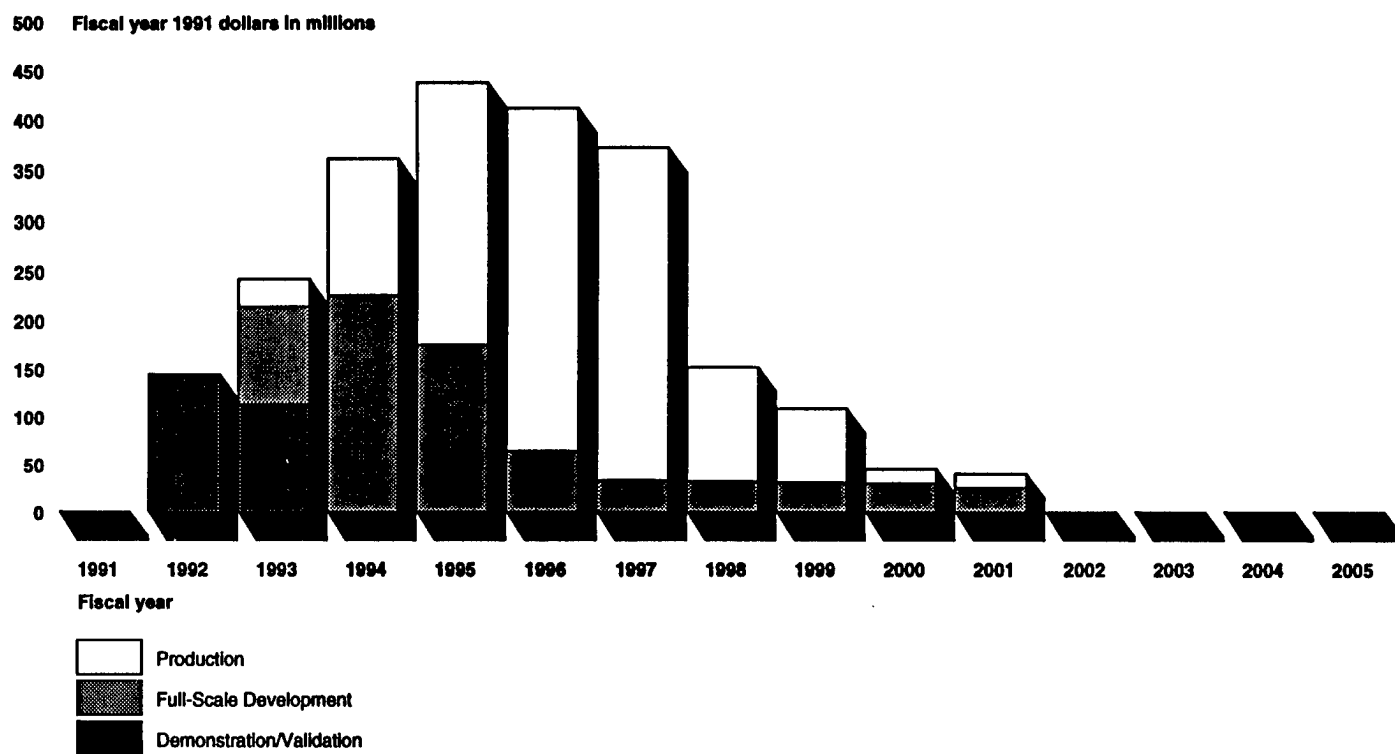
Figure III.4: Planned Funding for the Extended Range Interceptor



Theater High Altitude Area Defense

The Theater High Altitude Area Defense project is intended to develop a ground-based interceptor that would operate as a theater defense in the upper atmosphere. Annual funding for the Theater High Altitude Area Defense interceptor reaches a peak of \$437.2 million during fiscal year 1995 (see fig. III.5). Production funding reaches its maximum during the following year. Planned funding for the full-scale development portion of the project is completely concurrent with production funding, as previously shown in figure III.1.

Figure III.5: Planned Funding for Theater High Altitude Area Defense

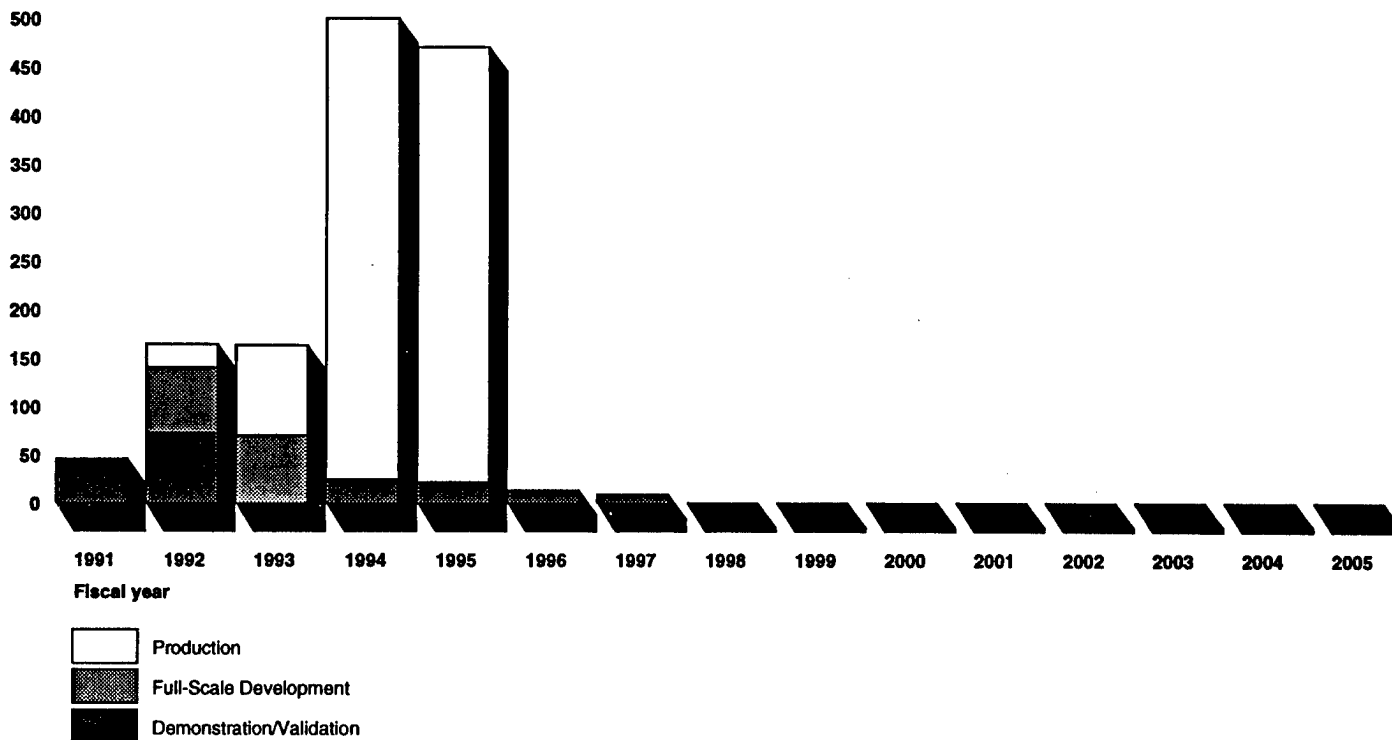


Patriot

SDIO has planned production funding for an upgrade of the Patriot missile as early as fiscal year 1992. The upgrade will add an active radar and provide autonomous firing capability. The bulk of the funding for production of the Patriot is contained in fiscal years 1994 and 1995 (see fig. III.6). The funding designated for the demonstration and validation phase of the Patriot from fiscal year 1994 is for future upgrades, according to the SDIO Director of Financial Management.

Figure III.6: Planned Funding for Patriot

Fiscal year 1991 dollars in millions



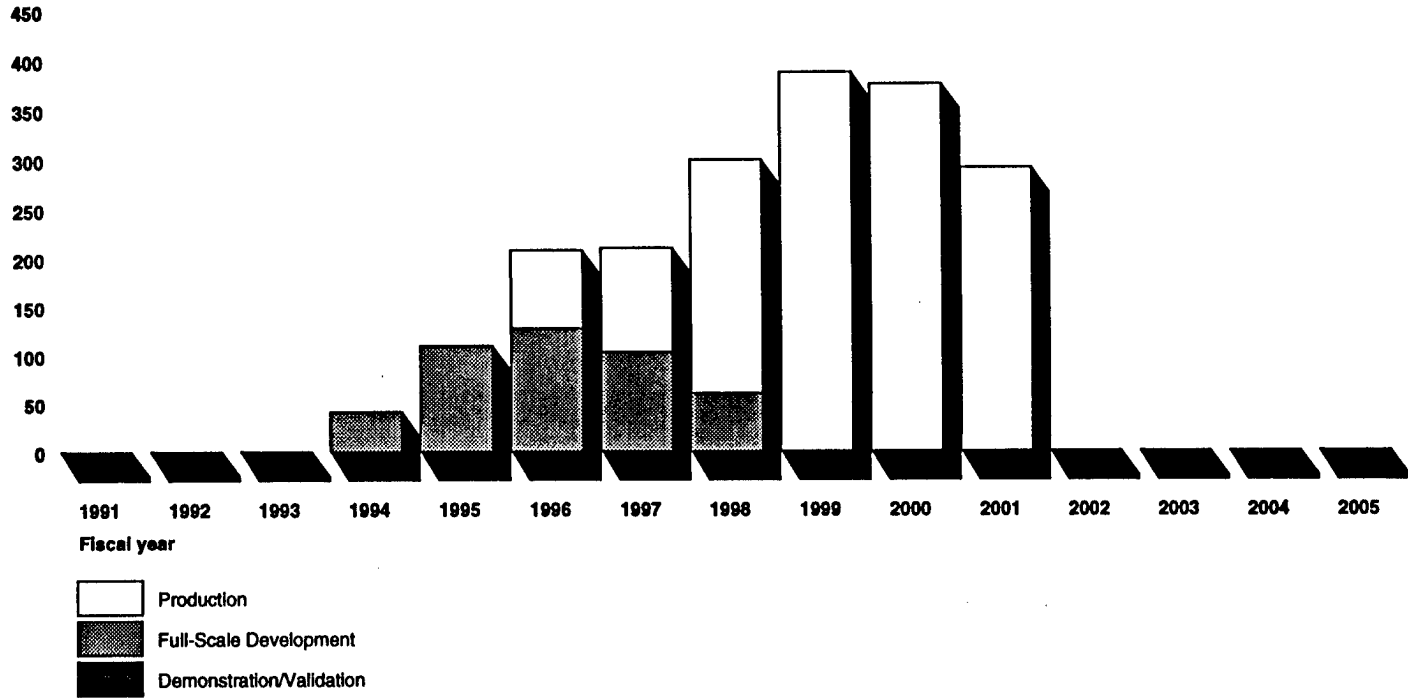
Corps Surface-to-Air Missile

The Corps Surface-to-Air Missile (CORPS SAM) is intended to defend Army Corps against aircraft and tactical missiles. Figure III.7 shows no funding for the demonstration and validation phase because SDIO plans to complete that work under a Theater Missile Defense Special Studies project, according to the Director of Financial Management.

Appendix III
Global Protection Against Limited Strikes:
Theater Segment

Figure III.7: Planned Funding for the Corps Surface-to-Air Missile

500 Fiscal year 1991 dollars in millions



Technology

The Technology funding category contains projects to develop both GPALS and non-GPALS related technology. Separating the GPALS-related technology development projects from the interceptor and sensor projects in the three GPALS segments avoids judgmental allocations in cases where the technologies may support systems in more than one GPALS segment. Non-GPALS technology projects include Innovative Science and Technology projects and projects to develop follow-on systems to GPALS, such as directed energy weapons.

SDIO plans to provide more funding to directed energy technology projects than to any other type of technology project, as shown in figure IV.1. Annually, SDIO's planned funding for directed energy remains stable until after fiscal year 1997, which is the last year covered in the current Future Years Defense Plan (see fig. IV.2). SDIO has planned the greatest amount of directed energy funding, about \$1.2 billion, in fiscal year 2001. Funding for the whole technology funding category also peaks during fiscal year 2001, reaching roughly \$2.9 billion.

Figure IV.1: Planned Funding for Technology Projects, 1991-2005

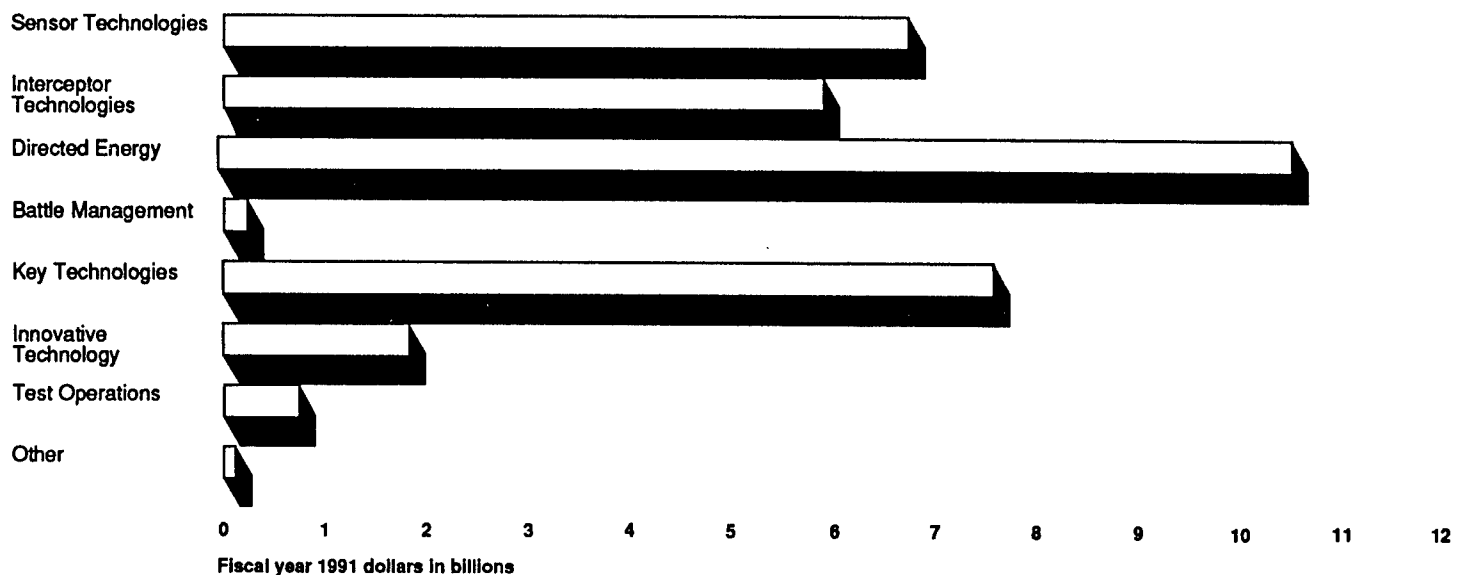
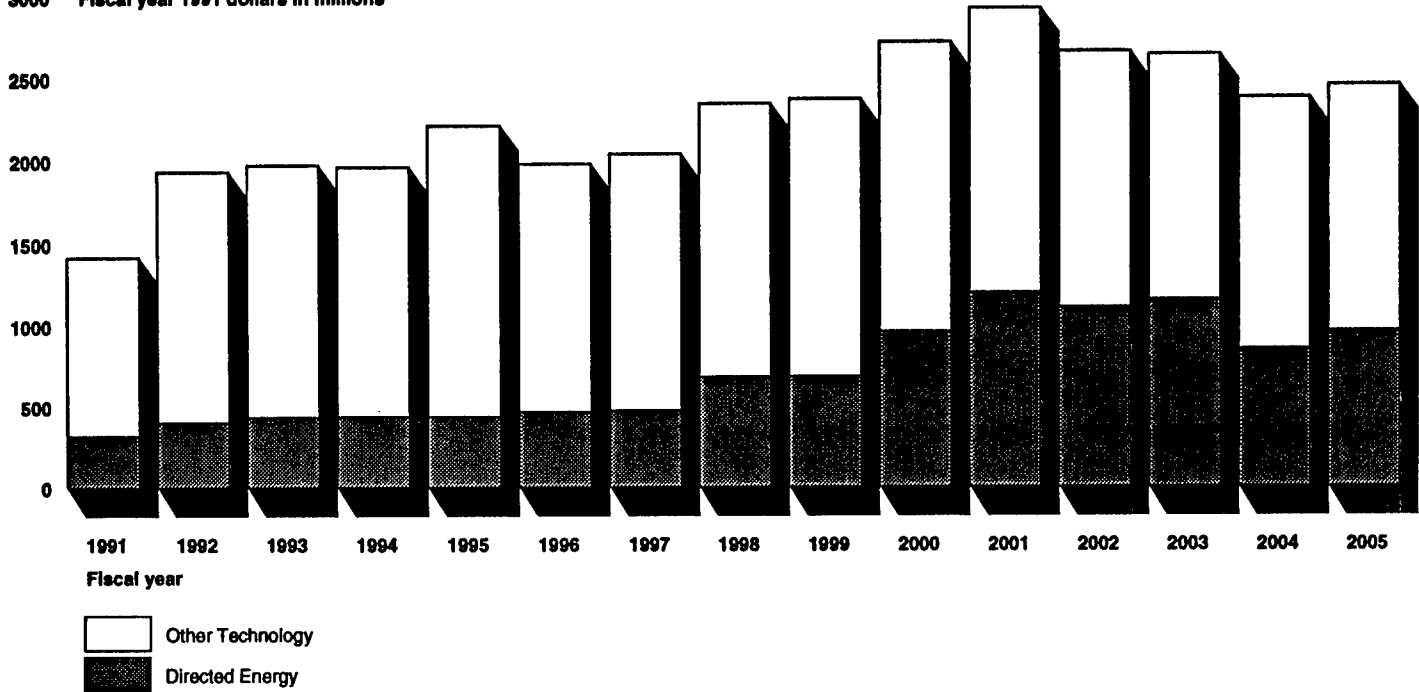


Figure IV.2: Comparison of Directed Energy Technology Funding With Total Technology Funding

3000 Fiscal year 1991 dollars in millions



Management and Support

The Management and Support funding category contains funding for projects related to managing the SDI program and providing integration and support services, such as systems analysis. SDIO's projected management and support funding requirements for the SDI program will absorb between 16 and about 23 percent of the annual program costs. During fiscal year 1991, management and support costs reached 23 percent of the total program cost. However, in absolute terms, fiscal year 1991 contained \$713 million for management and support, the smallest amount planned for any year (see fig. V.1).

Figure V.1: Management and Support Funding

